

Research Paper

Determination of Trace Elements Contents in Rice and Vegetables Cultivated in Selected Districts of Sri Lanka

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Abstract

Rice and vegetables are major components in Sri Lankan meal and the accumulation of trace elements in edible crops is a major concern today. Therefore, this study was conducted to find out the levels of toxic trace elements in rice and vegetables produced in selected districts of Sri Lanka. One hundred rice grain samples were collected using multistage random sampling technique from Ampara, Anuradhapura and Kurunagala districts while 104 vegetable samples were collected from Nuwara Eliya, Kandy and Puttalam districts. Elemental analysis (in their cationic form) was carried using Inductively Coupled Plasma Mass spectrometer (ICP-MS). Arsenic (As), cadmium (Cd), mercury (Hg), lead (Pb) and selenium (Se), cobalt (Co), nickel (Ni), copper (Cu), thallium (Tl), vanadium (V), beryllium (Be), chromium (Cr) and manganese (Mn) were tested. The mean concentrations of As (0.045 mg kg^{-1} , 0.005 mg kg^{-1}), Cd (0.027 mg kg^{-1} , 0.007 mg kg^{-1}) and Pb (0.19 mg kg^{-1} , 0.021 mg kg^{-1}) were found in rice and vegetable samples, respectively. Results were reported in fresh weight basis and those were less than the maximum permissible levels reported by FAO/WHO. With the current consumption pattern, the daily human intake of As, Cd, Pb, Hg, Se, Cr, Ni, Cu and Mn ascribed to a diet of rice and vegetable were estimated. Except for Cr in rice, daily intake of all the elements through rice and vegetables were less than the tolerable daily intake values.

Keywords: ICP-MS, Rice, Trace element, Vegetables